

Applicants: Jae-In JEONG and Tae-Gyoon LIM
Serial No.: 10/534,134
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REMARKS

Claims 1-10 were pending in the application. Claims 1, 2, 4 and 5 have been amended. Accordingly, claims 1-10 are presently being examined.

Section 1 and 2 of the Office Action rejected claims 1-10 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,404,982 to Mariner et al. ("Mariner patent") in view of U.S. Patent No. 3,553,010 to Rubisch ("Rubisch patent").

According to the Office Action, the Mariner patent shows each element of the invention recited in claims 1-10 except a protective barrier having an aluminum-rich compound layer. However, the Office Action also states that the Rubisch patent shows: (1) a graphite body provided with a protective barrier including a primary layer and a cover layer wherein the primary layer is a compound of boron, nitrogen, silicon, and the cover layer is an aluminum rich compound (claim 1 and 2); (2) the layers sprayed or painted on the graphite body being heat treated to form the barrier layer (claim 4, 9 and 10); (3) the thickness of the resultant protective barrier being at least 70 micrometers (claim 3); (4) other elements associated with the nitrogen containing compound including aluminum, titanium, iron, and oxygen, separately or in combination together which can serve as the catalysts (claims 5 and 7); and (5) thickness which is inherently in the range recited (claim 8).

According to this Office Action, it would have been obvious to one of ordinary skill in the art to adapt the Mariner patent with the aluminum-rich compound layer of the Rubisch patent to further increase the thermal resistance as well as the stability

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with respect to oxidation.

Applicants respectfully submit that in the Mariner patent the resistance-heat boat is manufactured only by one step, that is, by cooling boron nitride ("BN") on the graphite body. This process "is conventional and briefly involves introducing vapors of ammonia and a gaseous boron halide", see column 2, lines 24-29 of the Mariner patent. In contrast, as recited in at least independent claims 1 and 4, the resistance-heat boat of the present invention can be manufactured by a two step process: (1) coating (spraying or painting) the surface of the graphite body with a nitrogen containing compound (BN); and (2) heat treating to cause a reaction between the aluminum and BN to produce a protective barrier.

Also, the "chemical vapor deposition" method of BN coating of the Mariner patent must be performed at a controlled temperature of between 1800°C to 2200°C. In contrast, the present invention as recited in at least independent claims 1 and 4, allow for BN coating by simple "spraying or painting".

Further the Mariner patent provides a method of manufacturing the vaporization boat to extend the useful life of the boat by "increasing the density" of the BN outer coating, see column 1 in lines 56-61 of the Mariner patent. In contrast, the present invention teaches and recites in independent claims 1 and 4 the providing of an additional coating "layer" of aluminum nitride ("AlN layer") for stable and continuous metal evaporation.

In other words, while the outer surface of the completed protective layer of the Mariner patent is a 'BN layer', the

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outer surface of the protective layer as taught by the present invention and as recited in claims 1 and 4 is an 'AlN layer', that is, a nitrogen containing compound layer containing aluminum nitride as its main constituent, see page 8 in lines 18-21, of the present specification.

In contrast to the purpose of the present invention which is to provide a resistance-heated boat, the Rubisch patent's purpose is to "arrest oxidation" particularly in the different field of an "arc electrode". Accordingly, the Rubisch patent teaches a double layer (primary layer and metallic cover layer) which can be effected in a known manner by means of "flame injection", see column 2 in lines 13-14 of the Rubisch patent, for mechanical bonding only. To complete the process ("close the pores"), however, the graphite body with the double layer must then be heated above approximately 550°C. The finding of the Rubisch patent, as discussed in column 2 in lines 25-31 of the Rubisch patent is based on the fact that "silicon which is dissolved mainly in aluminum reacts with the carbon of the fundamental body forming silicon carbide when the operational temperature of the protected parts exceeds about 550°C, which leads to a tear free and solid bond between the protective layer to the carbon part"(emphasis added). Thus, in the Rubisch patent, silicon is a very important constituent. However, in the present invention as recited in at least independent claims 1 and 4, no silicon layer is present (primary layer). In other words, unlike the Rubisch patent, the present invention does not require reacting silicon, dissolved in aluminum, with carbon.

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Since claims 2, 3, and 5-10, depend directly or indirectly on claims 1 and 4, and because a claim which depends on another claim is subject to all the limitations of that other claim, applicants respectfully submit that claims 2, 3, and 5-10 are not unpatentable over the Mariner patent in view of the Rubisch patent for at least the same reasons discussed above with respect to independent claims 1 and 4.


In view of the remarks above and the amendment to claims 1, 2, 4 and 5, applicants respectfully request that the rejections in the Office Action be reconsidered and withdrawn, and earnestly solicit a Notice of Allowance.

If a telephone interview would be of assistance in advancing prosecution of the subject application, applicants' undersigned attorney invites the Examiner to telephone him at the number provided below.

No fees are deemed necessary in connection with the filing of this Amendment. However, if any such fees are required, authorization is hereby given to charge the amount of any such fees to Deposit Account No. 03-3125.

Respectfully submitted,

I hereby certify that this paper is being deposited this date with the U.S. Postal Service as first class mail addressed to: Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450	
 Richard S. Milner Reg. No. 33,970	<u>27 July 2006</u> Date


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